We claim:

A transition metal compound of the formula

10 $\begin{bmatrix}
R^{1} & R^{2} \\
C^{b} = N^{b} & T \\
(C'(R^{5})_{2})_{m} & M
\end{bmatrix} Q \qquad (A^{n-})_{x} \qquad (I)$ $\begin{bmatrix}
R^{1} & R^{2} & T \\
(C'(R^{5})_{2})_{m} & M
\end{bmatrix} Q \qquad q$

where the substituents and indices have the following meanings:

R¹, R³ are hydrogen, C₁-C₂₀-alkyl, C₃-C₁₀-cycloalkyl,

C₆-C₁₆-aryl, alkylaryl having from 1 to 10 carbon atoms in the alkyl part and from 6 to 16 carbon atoms in the aryl part, Si(R⁶)₃, N(R⁶)(R⁷), OR⁶, SR⁶ or R¹ and R³ together with C^a, C^b and, if present, C' form a five-, six- or seven-membered aliphatic or aromatic, substituted or unsubstituted carbocyclic or heterocyclic ring,

 R^2 , R^4 are C_4 — C_{16} —heteroaryl or C_6 — C_{16} —aryl bearing C_4 — C_{16} —heteroaryl or C_6 — C_{16} —aryl substituents in the two vicinal positions relative to the linkage point to N^a or N^b ,

is hydrogen, C_1-C_{10} -alkyl, C_6-C_{16} -aryl or alkylaryl having from 1 to 10 carbon atoms in the alkyl part and from 6 to 16 carbon atoms in the aryl part,

 R^6 , R^7 are C_1 - C_{10} -alkyl, C_6 - C_{16} -aryl or alkylaryl having from 1 to 10 carbon atoms in the alkyl part and from 6 to 16 carbon atoms in the aryl part,

m is 0 or 1,

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M is a metal of group VIIIB of the Periodic Table of the Elements,

T, Q are uncharged or monoanionic monodentate ligands or T and Q together form a diketoenolate unit or a C_2- or

 C_3 -alkylene unit having a methyl ketone end group or a linear C_1 - C_4 -alkylester or nitrile end group,

A is a noncoordinating or weakly coordinating anion,

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x, p are 0, 1, 2 or 3 and

q, n are 1, 2 or 3.

- 10 2. A transition metal compound as claimed in claim 1, wherein \mathbb{R}^2 and \mathbb{R}^4 are, independently of one another, 2,6-diphenylphenyl,
 - 2,6-di(4'-methylphenyl)phenyl,
 - 2,6-di(4'-t-butylphenyl)phenyl,
 - 2,6-di(4'-methoxyphenyl)phenyl,
- 2,6-bis(3',5'-dimethylphenyl)phenyl or
 - 2,6-bis(2',4',6'-trimethylphenyl)phenyl or
 - 2,5-diphenylpyrrolidyl, 2,5-di(4'-methylphenyl)pyrrolidyl,
 - 2,5-di(4'-t-butylphenyl)pyrrolidyl,
 - 2,5-di(4'-methoxyphenyl)pyrrolidyl,
- 20 2,5-bis(3',5'-dimethylphenyl)pyrrolidyl or
 - 2,5-bis(2',4',6'-trimethylphenyl)pyrrolidyl or
 - -2,5-diphenylpyrrolide,-2,5-di(4'-methylphenyl)pyrrolide,----
 - 2,5-di(4'-t-butylphenyl)pyrrolide,
 - 2,5-di(4'-methoxyphenyl)pyrrolide,
- 2,5-bis(3',5'-dimethylphenyl)pyrrolide or
 - 2,5-bis(2',4',6'-trimethylphenyl)pyrrolide.
 - A transition metal compound as claimed in claim 1 or 2, wherein R² and R⁴ are 2,6-di(4'-methoxyphenyl)phenyl or
- 30 2,5-di(4'-methoxyphenyl)pyrrolidyl.
 - 4. A transition metal compound as claimed in any of claims 1 to 3, wherein M is palladium or nickel.
- 35 5. A transition metal compound as claimed in any of claims 1 to 4, wherein T is halide or methyl and Q is halide.
 - 6. A catalyst system for the (co)polymerization of olefinically unsaturated monomers, comprising as active constituents a
- transition metal compound as claimed in any of claims 1 to 5 and a strong uncharged Lewis acid, anionic compound having a Lewis-acid cation or an ionic compound having a Brönsted acid as cation as cocatalyst.

7. A catalyst system as claimed in claim 6, wherein an aluminoxane compound is used as strong uncharged Lewis acid or $NaB[C_6H_3(CF_3)_2]_4$ is used as ionic compound having a Lewis-acid cation.

8. A process for preparing polymers of olefinically unsaturated polar and/or nonpolar monomers, which comprises polymerizing the starting monomers in the presence of a catalyst system as claimed in claim 6 or 7.

- A process as claimed in claim 8, wherein ethene is used as starting monomer.
- 10. The use of a transition metal compound as claimed in any of claims 1 to 5 or the catalyst system as claimed in claim 6 or 7 for the (co)polymerization of olefinically unsaturated polar and/or nonpolar monomers.

Polymerization active transition metal complexes having bulky ligand systems

5 Abstract

Transition metal complexes having bulky ligand systems and the formula (I)

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15 $\begin{bmatrix}
R^{1} & R^{2} \\
C^{b} = N^{b}
\end{bmatrix} \qquad T \qquad (A^{n-})_{x} \qquad (I)$ $\begin{bmatrix}
C^{a} = N^{a} & R^{4}
\end{bmatrix} \qquad q$

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where

R², R⁴ are C_4 — C_{16} —heteroaryl or C_6 — C_{16} —aryl bearing

C₄— C_{16} —heteroaryl or C_6 — C_{16} —aryl substituents in the two vicinal positions relative to the point of linkage to N^a or N^b and

M is a metal of group VIIIB of the Periodic Table of the Elements,

are described.

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